

In the Claims

1. (Currently Amended) A method comprising:  
replicating ~~a change to~~ an operation on data from first data storage in a first security domain to second data storage in a second security domain, wherein  
the first security domain and the second security domain are independent of ~~each other~~  
one another,  
the first security domain permits a first host in the first security domain to directly  
access the first data storage, and  
the first security domain prohibits a second host in the second security domain from  
directly accessing the first data storage; ~~[[and]]~~  
awaiting a receipt of an acknowledgement that the operation on the data has been  
completed in the second security domain; and  
completing the ~~change to~~ operation on the data in the first security domain in response to  
~~receiving an~~ the receipt of the acknowledgement that the ~~change to~~ operation on the  
data has been ~~stored~~ completed in the second security domain, wherein the  
completing the operation in the second security domain comprises completing the  
operation on the data in second data storage in the second security domain.
2. (Currently Amended) The method of claim 1 wherein  
the replicating is performed over a controlled communication link from ~~[[a]]~~ the first host in the  
first security domain to ~~[[a]]~~ the second host in the second security domain.
3. (Currently Amended) The method of claim 2 wherein  
only the controlled communication link couples the first host to the second host.
4. (Previously Presented) The method of claim 1 wherein  
the first host controls access to the first security domain; and  
the second host controls access to the second security domain.
5. (Original) The method of claim 4 further comprising:  
the first host accessing data stored in the second security domain by requesting the data stored in  
the second security domain from the second host.

6. (Original) The method of claim 4 wherein the second data storage is inaccessible directly by the first host.

7. (Original) The method of claim 4 wherein the first data storage is inaccessible directly by the second host.

8. (Original) The method of claim 1 wherein the completing the change comprises  
notifying an application making the change to the data that the change is complete.

9. (Original) The method of claim 1 further comprising:  
using the data from the second data storage when the first data storage fails.

10. (Previously Presented) The method of claim 1 further comprising:  
reading a first portion of the data from the first data storage; and  
requesting a second portion of the data from the second host coupled to the second data storage.

11. (Previously Presented) The method of claim 1 wherein the first data storage and the second data storage are not connected to one local area network.

12. (Original) The method of claim 1 further comprising:  
replicating a second change to the data in the first data storage to the second security domain  
after the acknowledgement is received.

13. (Original) The method of claim 12 further comprising:  
completing the second change in the first security domain when a second acknowledgement is  
received that the second change to the data has been stored in the second storage area.

14. (Original) The method of claim 1 further comprising:  
restoring the data in the first data storage from the second data storage when the data are  
corrupted.

15. (Original) The method of claim 1 wherein the first data storage comprises a log.

16. (Original) The method of claim 1 further comprising:  
saving a version of data stored in the second data storage prior to storing the change to the data  
in the second data storage.

17. (Original) The method of claim 16 wherein  
both the version of the data and the change to the data are accessible after storing the change to  
the data in the second data storage.

18. (Original) The method of claim 1 wherein  
the second data storage comprises a log.

19. (Original) The method of claim 18 further comprising:  
constructing a current version of the data from the log.

20. (Original) The method of claim 1 wherein  
the second data storage comprises  
a log, and  
a storage volume.

21. (Original) The method of claim 20 further comprising:  
writing the change to the data to the log; and  
writing the change to the data from the log to the storage volume.

22. (Original) The method of claim 21 further comprising:  
allocating space in the second data storage for the change to the data when writing the change to  
the data from the log to the storage volume.

23. (Original) The method of claim 20 further comprising:  
writing an oldest change to the data from the log to the storage volume.

24. (Original) The method of claim 1 wherein  
the second data storage comprises  
a log,  
a storage volume, and  
a set of snapshots of the storage volume.

25. (Original) The method of claim 24 further comprising:  
periodically making a new snapshot of the set of snapshots.

26. (Original) The method of claim 25 further comprising:  
allocating a portion of the second data storage for storing the new snapshot when the new  
snapshot is made.

27. (Original) The method of claim 26 wherein  
the portion comprises storage for each block of a plurality of blocks in the storage volume.

28. (Original) The method of claim 24 wherein  
at least one of the set of snapshots is a copy-on-write snapshot.

29. (Original) The method of claim 28 wherein  
the copy-on-write snapshot is a most recent snapshot of the set of snapshots.

30. (Original) The method of claim 28 further comprising:  
writing the change to the log,  
writing a version of data in the storage volume to the copy-on-write snapshot, and  
writing the change to the data to the storage volume after writing the version of the data to the  
copy-on-write snapshot.

31. (Original) The method of claim 24 wherein  
at least one of the set of snapshots is an instant snapshot.

32. (Original) The method of claim 24 further comprising:  
combining data from at least two snapshots of the set of snapshots into a combined snapshot; and  
deleting the at least two snapshots.

33. (Original) The method of claim 32 wherein  
the at least two snapshots were created at adjacent points in time.

34. (Original) The method of claim 1 wherein  
the second data storage comprises  
a log,

a storage volume, and

a set of overlay storage objects, wherein

each overlay storage object of the set comprises respective data to be applied to the storage volume.

35. (Original) The method of claim 34 further comprising:  
writing the change to the data to the log;  
writing the change to the data from the log to one overlay storage object of the set.

36. (Original) The method of claim 35 wherein  
the one overlay storage object is a most recent overlay storage object of the set.

37. (Original) The method of claim 34 further comprising:  
reading data in the second data storage by  
reading the respective data from at least one overlay storage object of the set of overlay storage objects, and  
reading other data in the second data storage from the storage volume.

38. (Original) The method of claim 37 wherein  
the reading the respective data comprises reading the respective data in an order determined by a respective time for that each overlay storage object was created.

39. (Original) The method of claim 34 further comprising:  
writing the respective data from one overlay storage object of the set of overlay storage objects to the storage volume.

40. (Original) The method of claim 39 wherein  
the one overlay storage object is an oldest overlay storage object of the set.

41. (Original) The method of claim 39 further comprising:  
deleting the one overlay storage object.

42. (Currently Amended) A system comprising:  
**replicating** means for replicating ~~a change to~~ an operation on data from first data storage in a first security domain to second data storage in a second security domain, wherein

the first security domain and the second security domain are independent of ~~each other~~  
one another,

the first security domain permits a first host in the first security domain to directly  
access the first data storage, and

the first security domain prohibits a second host in the second security domain from  
directly accessing the first data storage; [[and]]

means for awaiting a receipt of an acknowledgement that the operation on the data has  
been completed in the second security domain; and

~~completing~~ means for completing the ~~change to operation on~~ the data in the first security  
domain in response to ~~receiving an~~ the receipt of the acknowledgement that the ~~change~~  
~~to operation on~~ the data has been ~~stored~~ completed in the second security domain,  
wherein the completing the operation in the second security domain comprises  
completing the operation on the data in second data storage in the second security  
domain.

43. (Currently Amended) The system of claim 42 wherein  
the ~~replicating~~ means for replicating is configured to perform the replicating of the operation  
over a controlled communication link from the first host in the first security domain to  
the second host in the second security domain.

44. (Currently Amended) A system comprising:  
a ~~replicating replication~~ module configured to replicate ~~a change to an operation on~~ data from  
first data storage in a first security domain to second data storage in a second security  
domain, wherein  
the first security domain and the second security domain are independent of ~~each other~~  
one another,  
the first security domain permits a first host in the first security domain to directly  
access the first data storage, and  
the first security domain prohibits a second host in the second security domain from  
directly accessing the first data storage; [[and]]  
a receiving module configured to await a receipt of an acknowledgement that the operation  
on the data has been completed in the second security domain; and

a ~~completing completion~~ module configured to complete the ~~change-to operation on~~ the data in the first security domain in response to ~~receiving an~~ the receipt of the acknowledgement that the ~~change-to operation on~~ the data has been ~~stored~~ completed in the second security domain, wherein the completing the operation in the second security domain comprises completing the operation on the data in second data storage in the second security domain.

45. (Currently Amended) The system of claim 44 wherein the ~~replicating replication~~ module is configured to perform the replication over a controlled communication link from the first host in the first security domain to the second host in the second security domain.

46. (Currently Amended) The system of claim 44 further comprising: a ~~using secondary~~ module configured to use the data from the second data storage when the first data storage fails.

47. (Previously Presented) The system of claim 44 further comprising: a reading module configured to read a first portion of the data from the first data storage; and a requesting module configured to request a second portion of the data from the second host coupled to the second data storage.

48. (Currently Amended) The system of claim 44 further comprising: a restoring module configured to restore the data in the first data storage from the second data storage ~~when the data are corrupted~~ , if the data becomes corrupted.

49. (Currently Amended) A computer-readable medium comprising: replicating instructions configured to replicate ~~a change-to an operation on~~ data from first data storage in a first security domain to second data storage in a second security domain, wherein the first security domain and the second security domain are independent of ~~each other~~ one another, the first security domain permits a first host in the first security domain to directly access the first data storage, and

the first security domain prohibits a second host in the second security domain from directly accessing the first data storage; ~~[[and]]~~  
awaiting a receipt of an acknowledgement that the operation on the data has been completed in the second security domain; and  
 completing instructions configured to complete the ~~change-to~~ operation on the data in the first security domain in response to ~~receiving-an~~ the receipt of the acknowledgement that the ~~change-to~~ operation on the data has been ~~stored~~ completed in the second security domain, wherein the completing the operation in the second security domain comprises completing the operation on the data in second data storage in the second security domain.

50. (Currently Amended) The computer-readable medium of claim 49 wherein the replicating instructions are configured to perform the replication over a controlled communication link from the first host in the first security domain to the second host in the second security domain.

51. (Original) The computer-readable medium of claim 49 further comprising: using instructions configured to use the data from the second data storage when the first data storage fails.

52. (Previously Presented) The computer-readable medium of claim 49 further comprising:  
 reading instructions configured to read a first portion of the data from the first data storage; and  
 requesting instructions configured to request a second portion of the data from the second host coupled to the second data storage.

53. (Currently Amended) The computer-readable medium of claim 49 further comprising:  
 restoring instructions configured to restore the data in the first data storage from the second data storage ~~when the data are corrupted~~ , if the data becomes corrupted.